

MRAD DESIGN REVIEW



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TOPICS OF DISCUSSION

- PROBLEM DEFINITION
- DELIVERABLES
- DESIGN CONCEPTS
- COMPONENTS
- BILL OF MATERIALS
- DESIGN PHASES
- PATH FORWARD
- CONCLUSION



PROBLEM DEFINITION

- DESIGN, FABRICATE, AND TEST AUTOMATED METHOD TO BURNISH LEAD SCREW THREADS. THIS DEVICE SHOULD BE ABLE TO BURNISH LEAD SCREW THREADS AUTOMATICALLY WITH MINIMAL USER INPUT AND BE ABLE TO ACHIEVE REPEATABILITY IN THREAD BACKLASH AND TORQUE TO A FINITE AMOUNT.

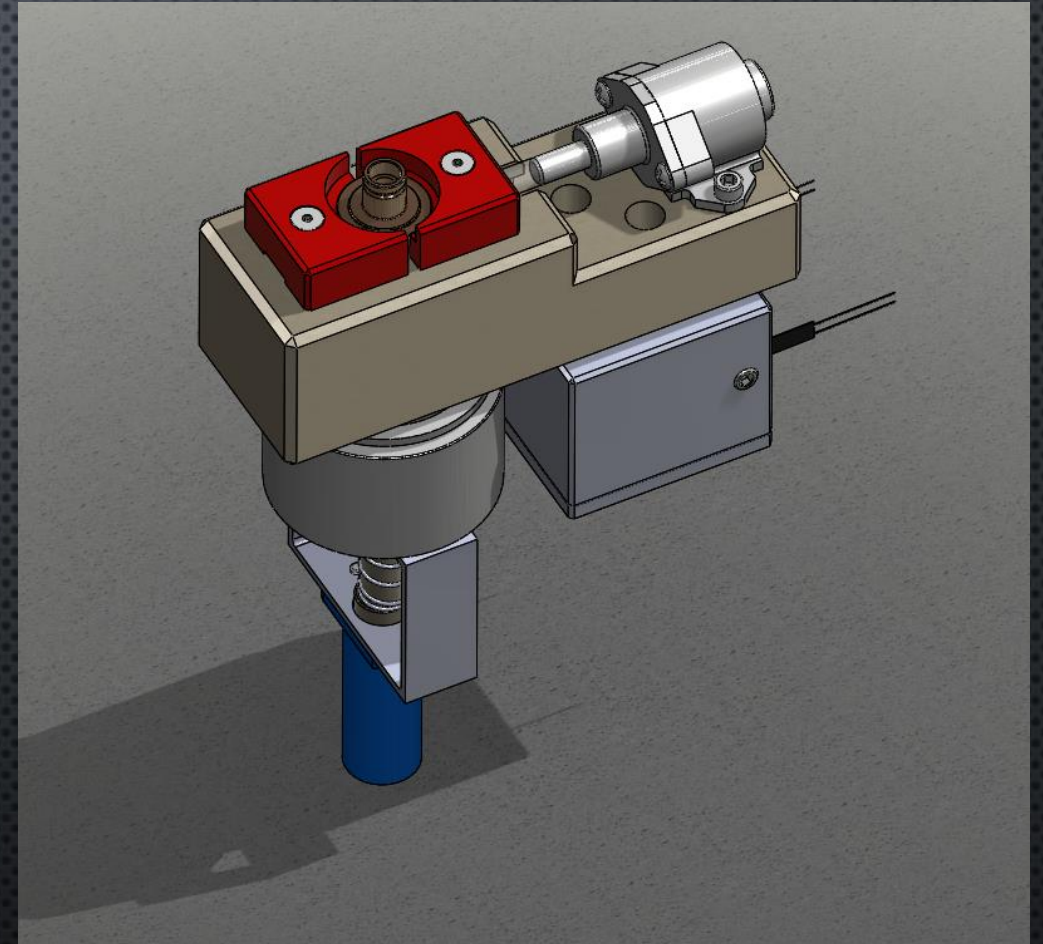
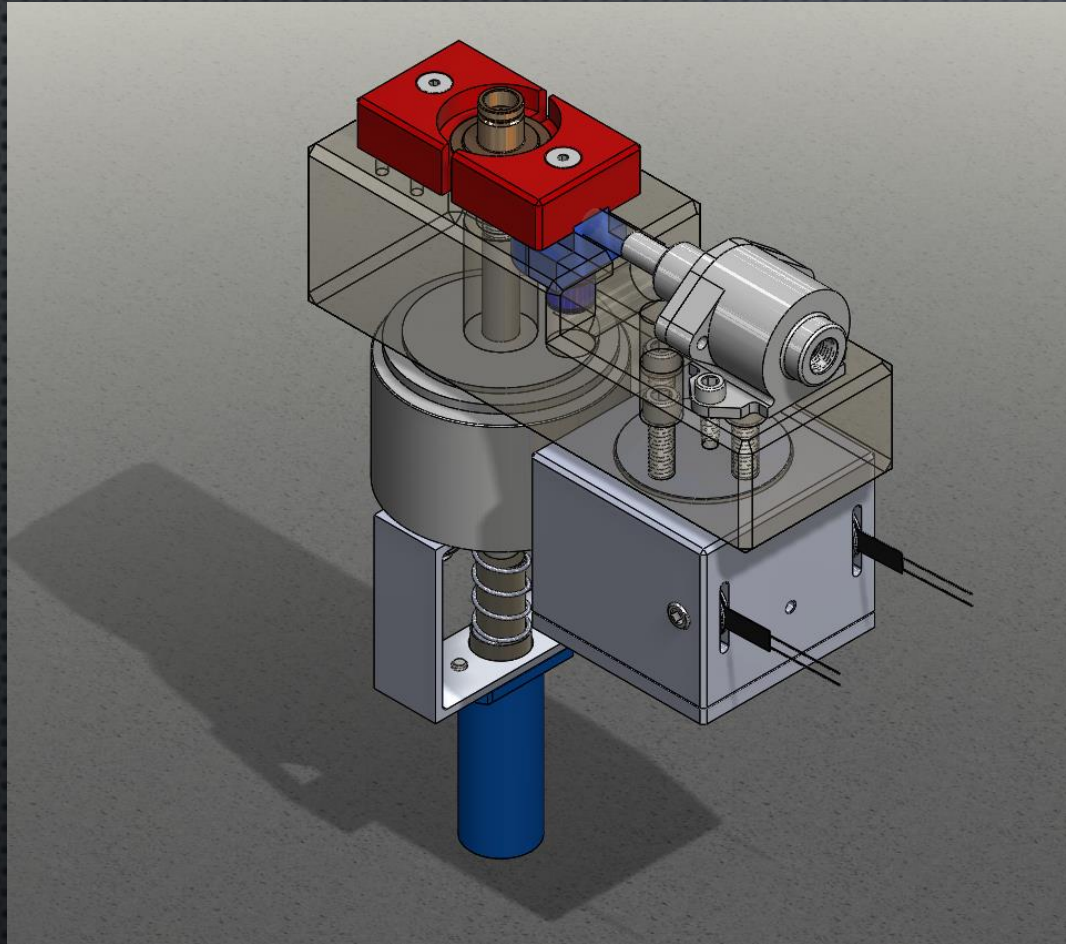


DELIVERABLES

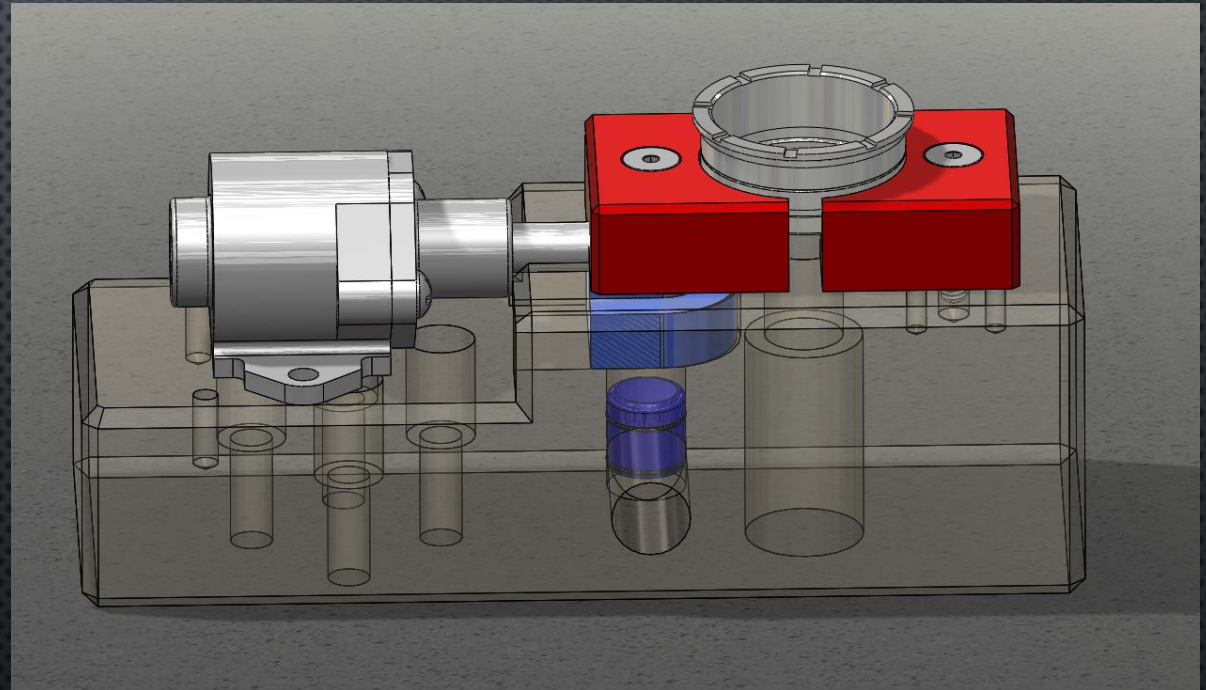
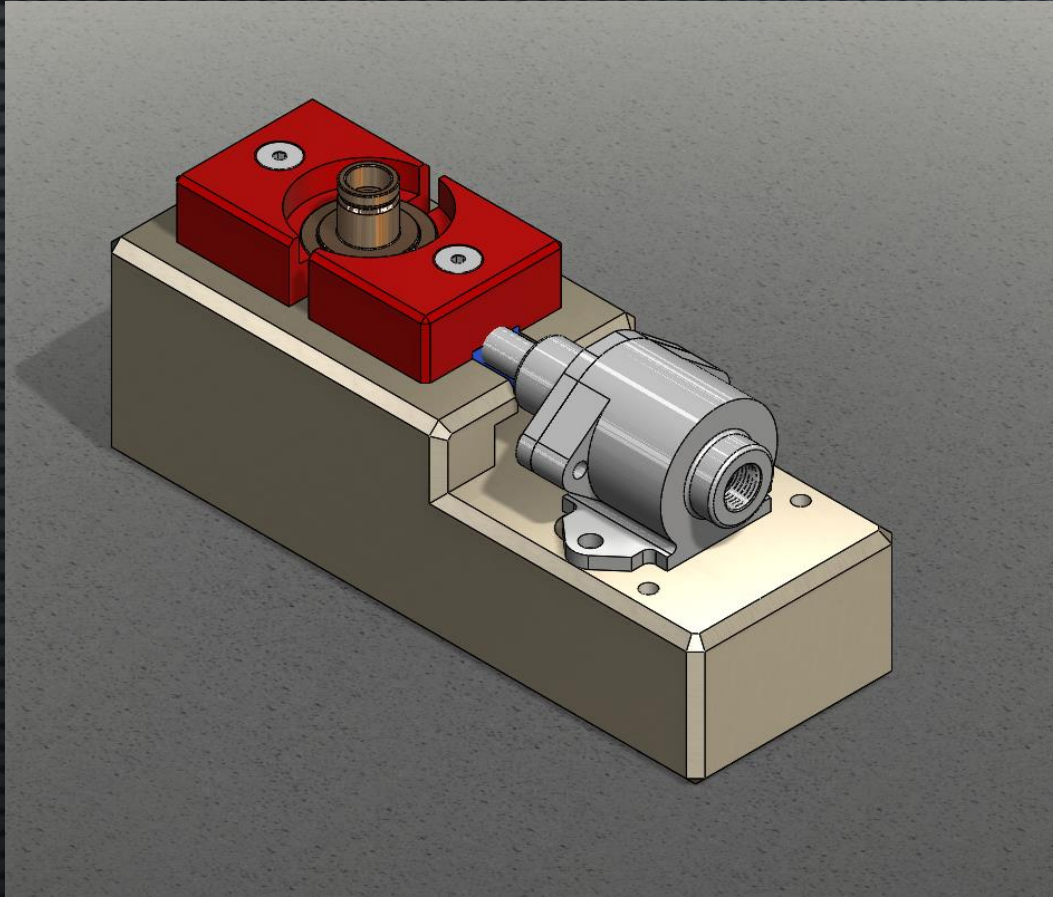
- DESIGN/PROTOTYPE AN AUTOMATED BURNISHING STAND
- ADJUSTABLE TO DIFFERENT MODELS
- MUST BE SIMPLE TO OPERATE
- CAPABLE OF BURNISHING TO A SPECIFIED TORQUE AND BACKLASH



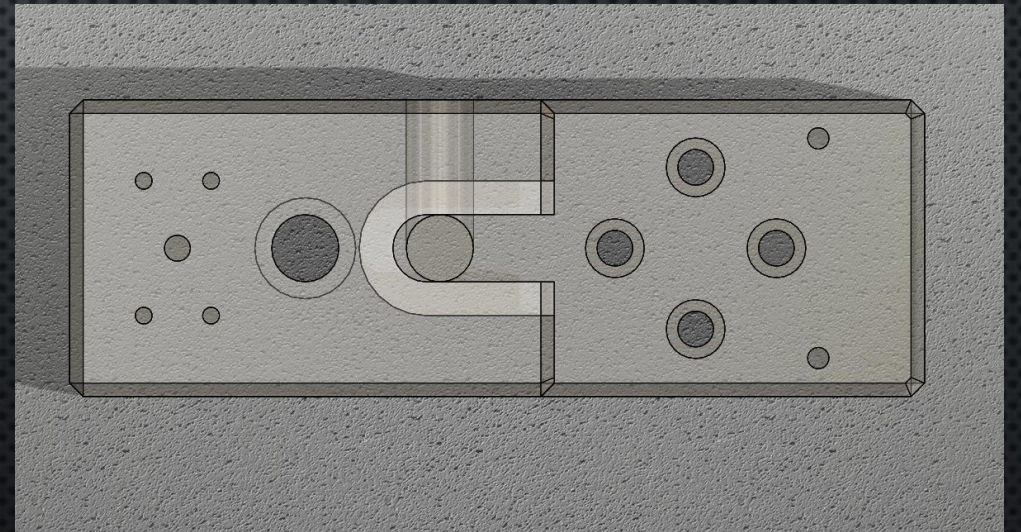
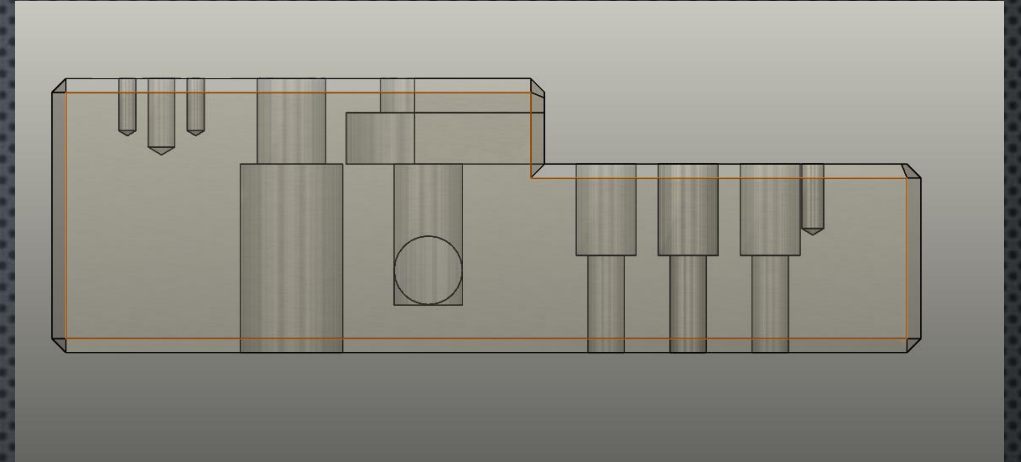
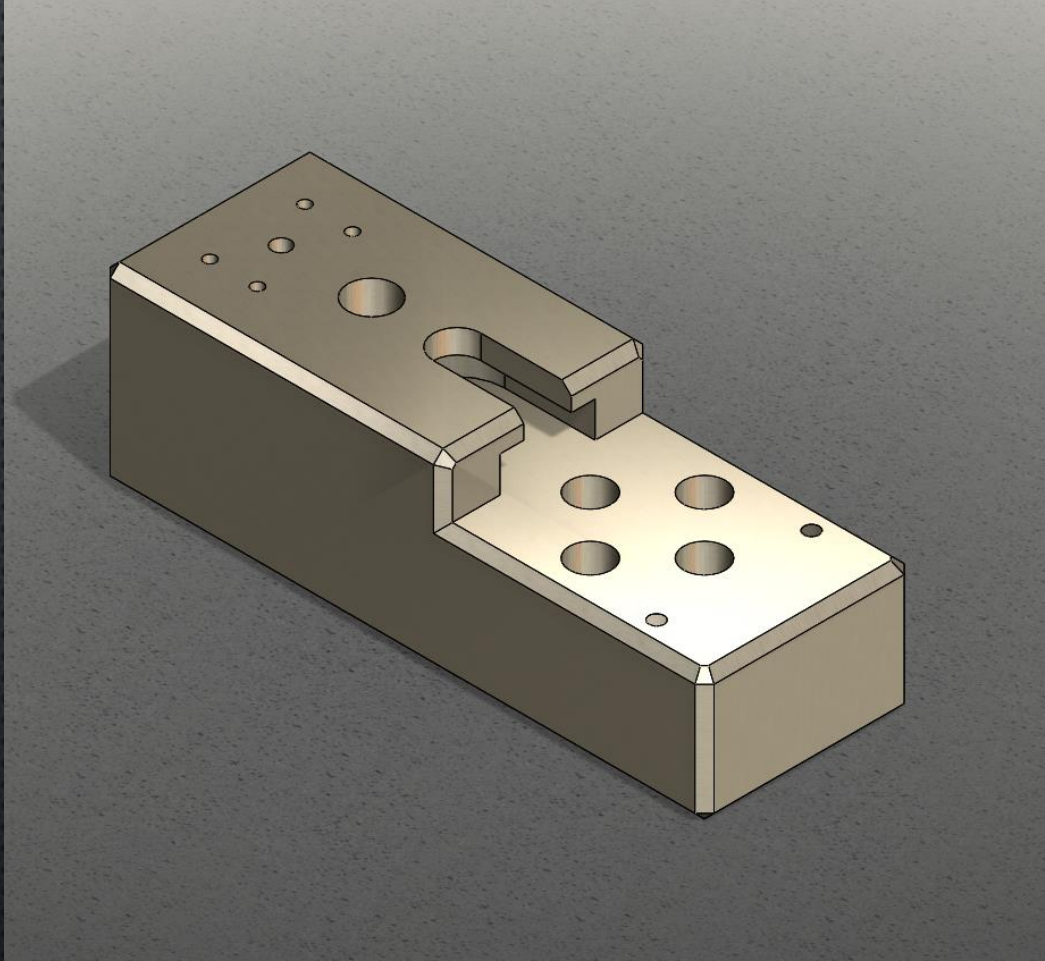
DESIGN CONCEPTS



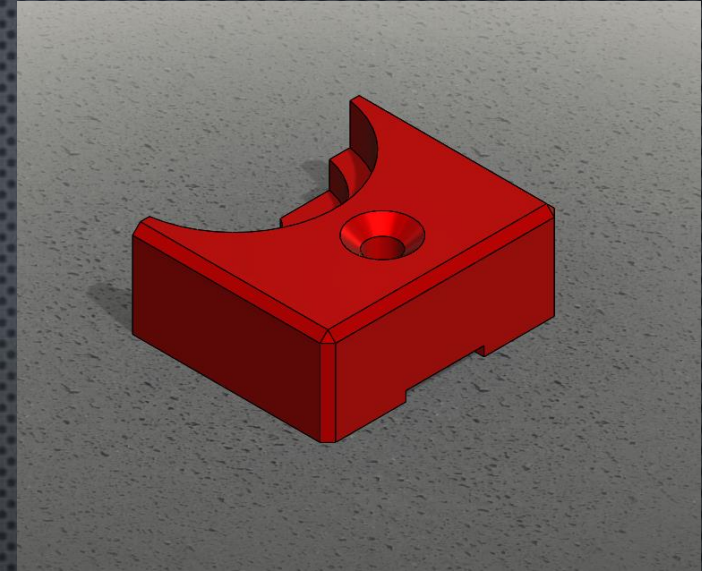
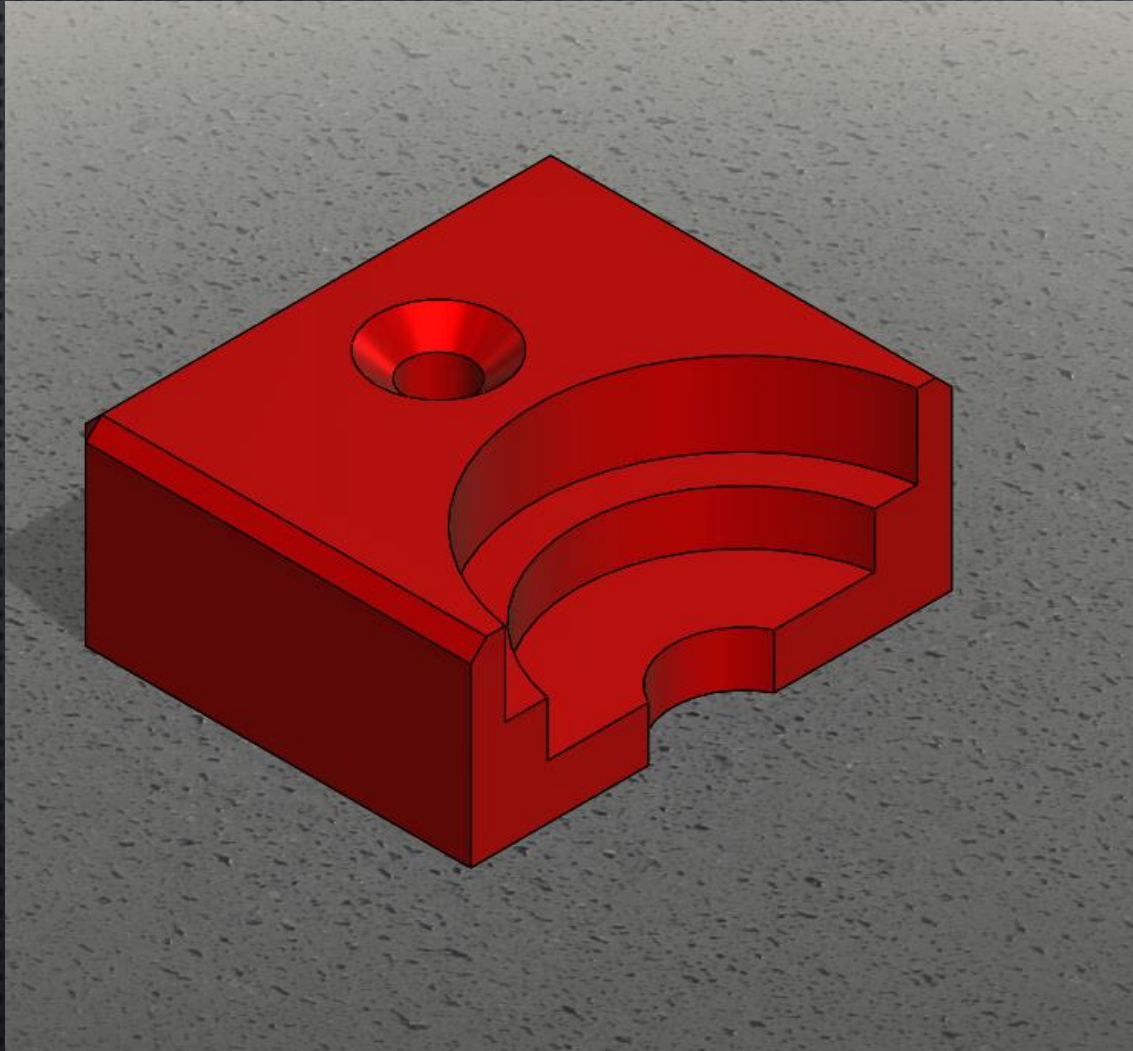
COMPONENTS

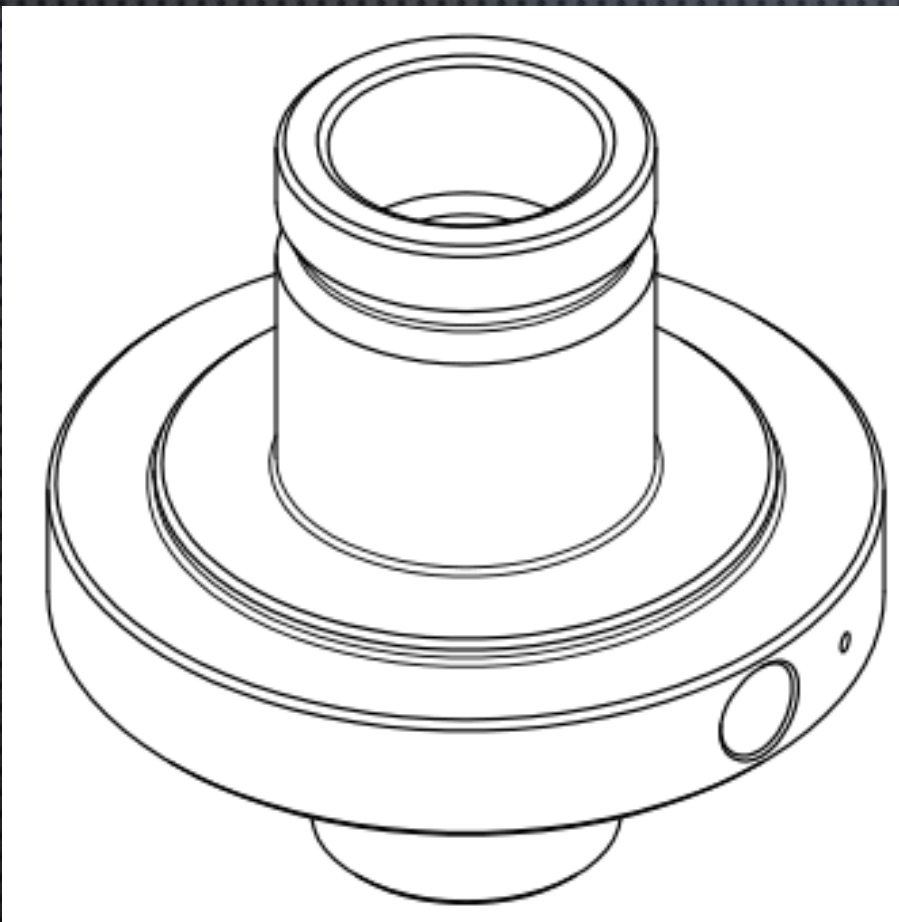


BASE

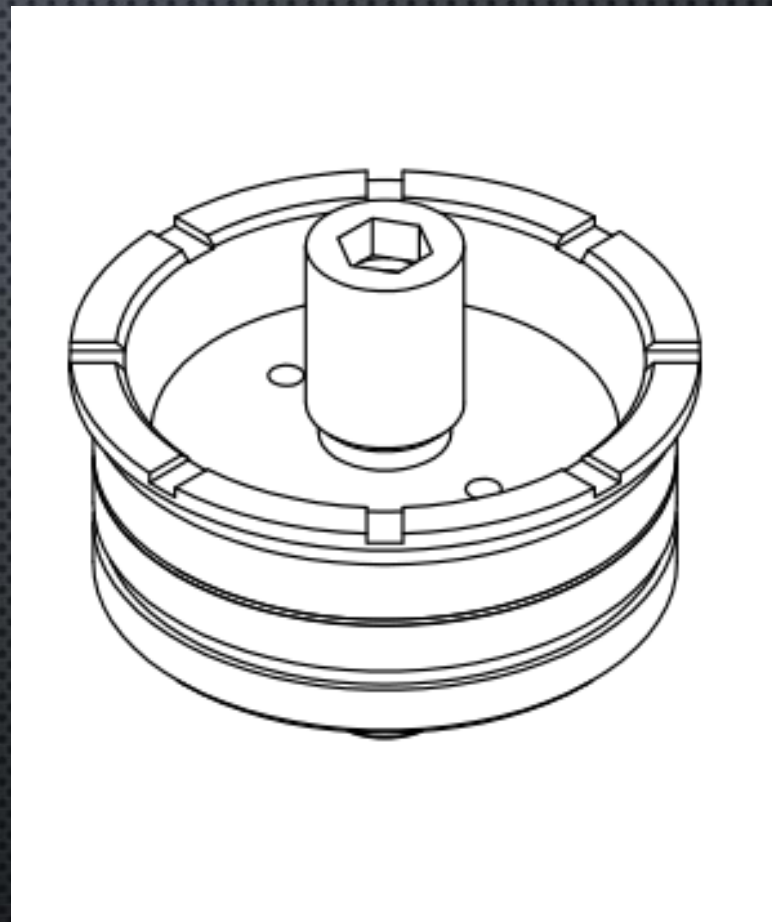


V-BLOCKS

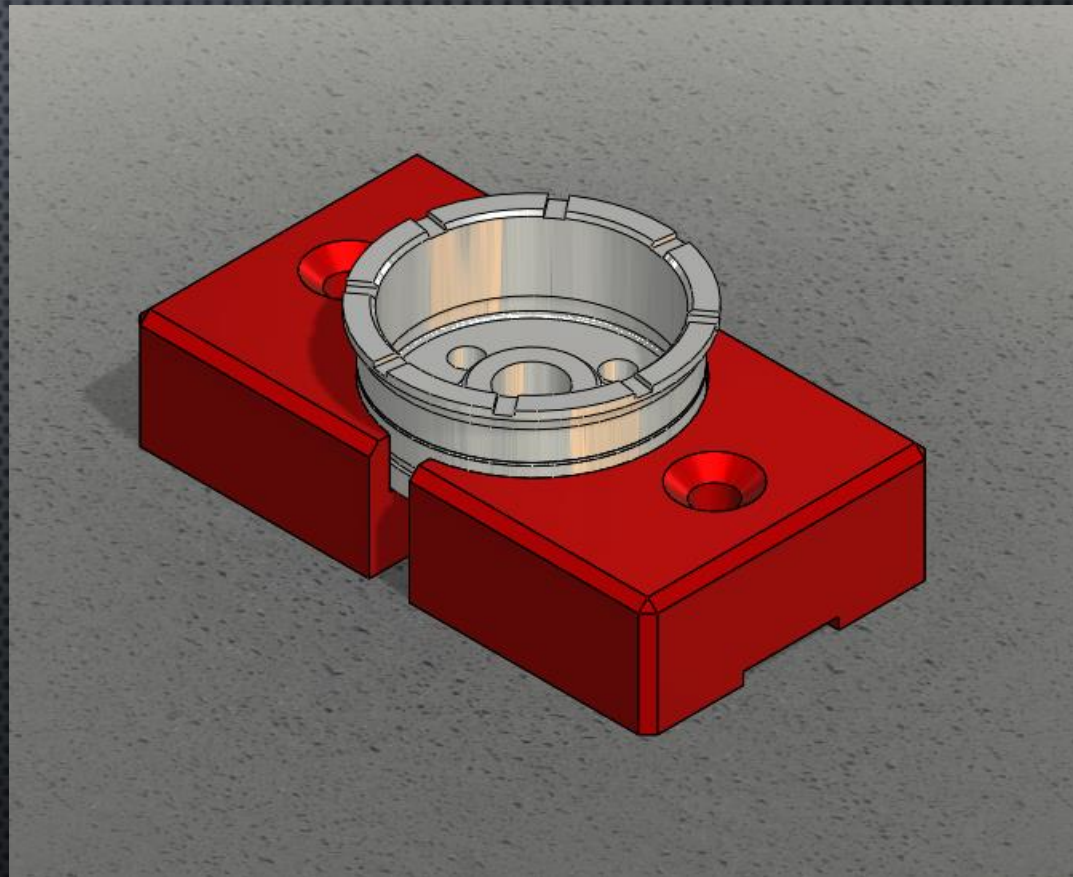
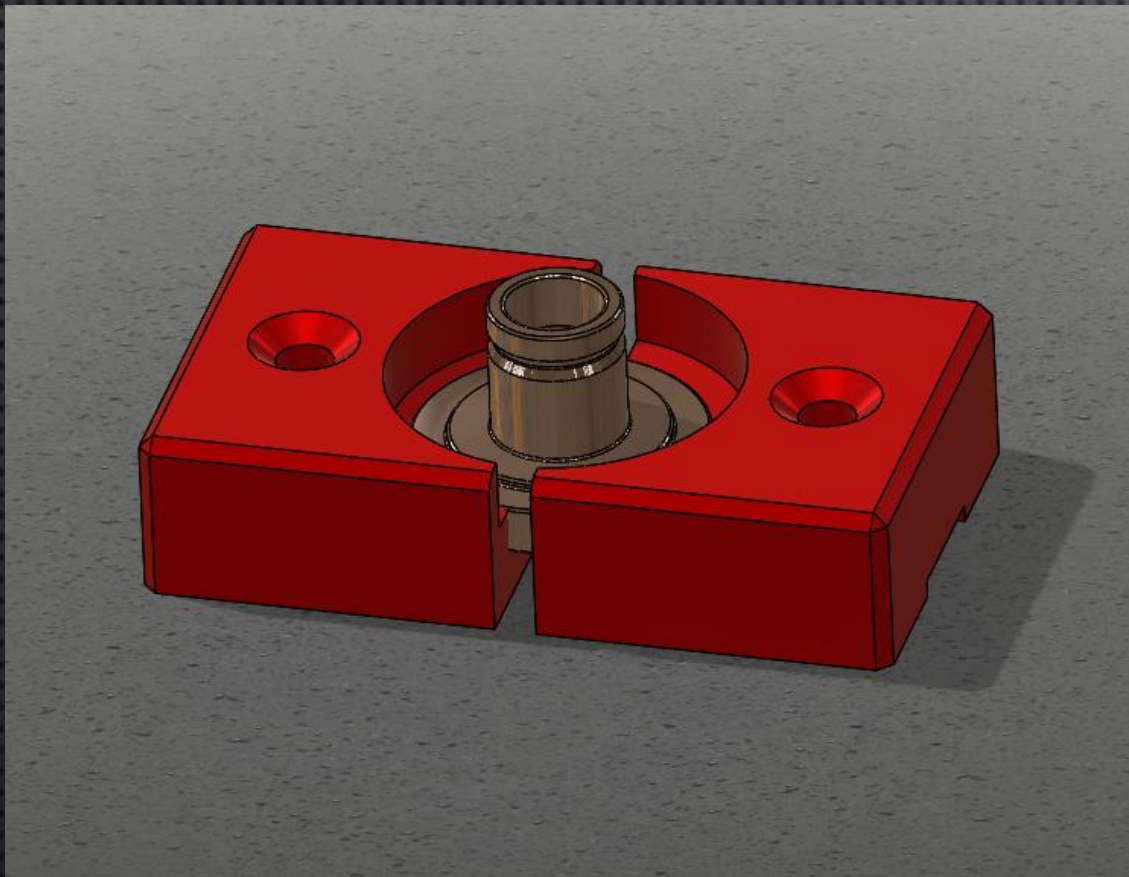




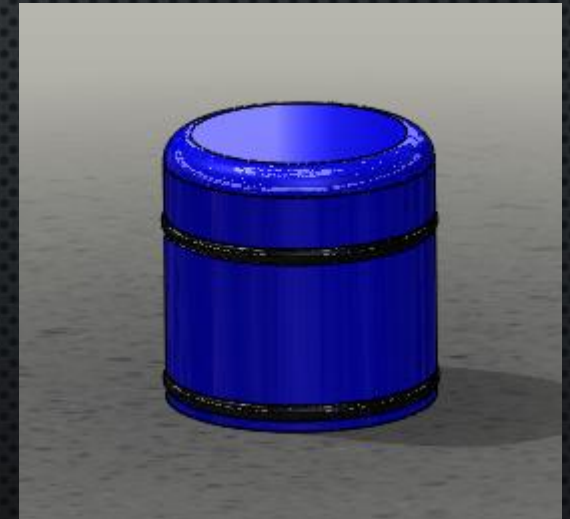
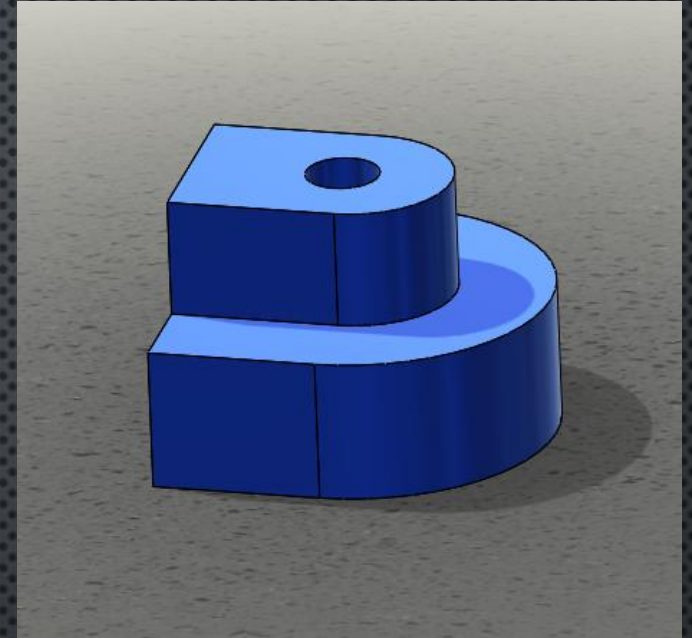
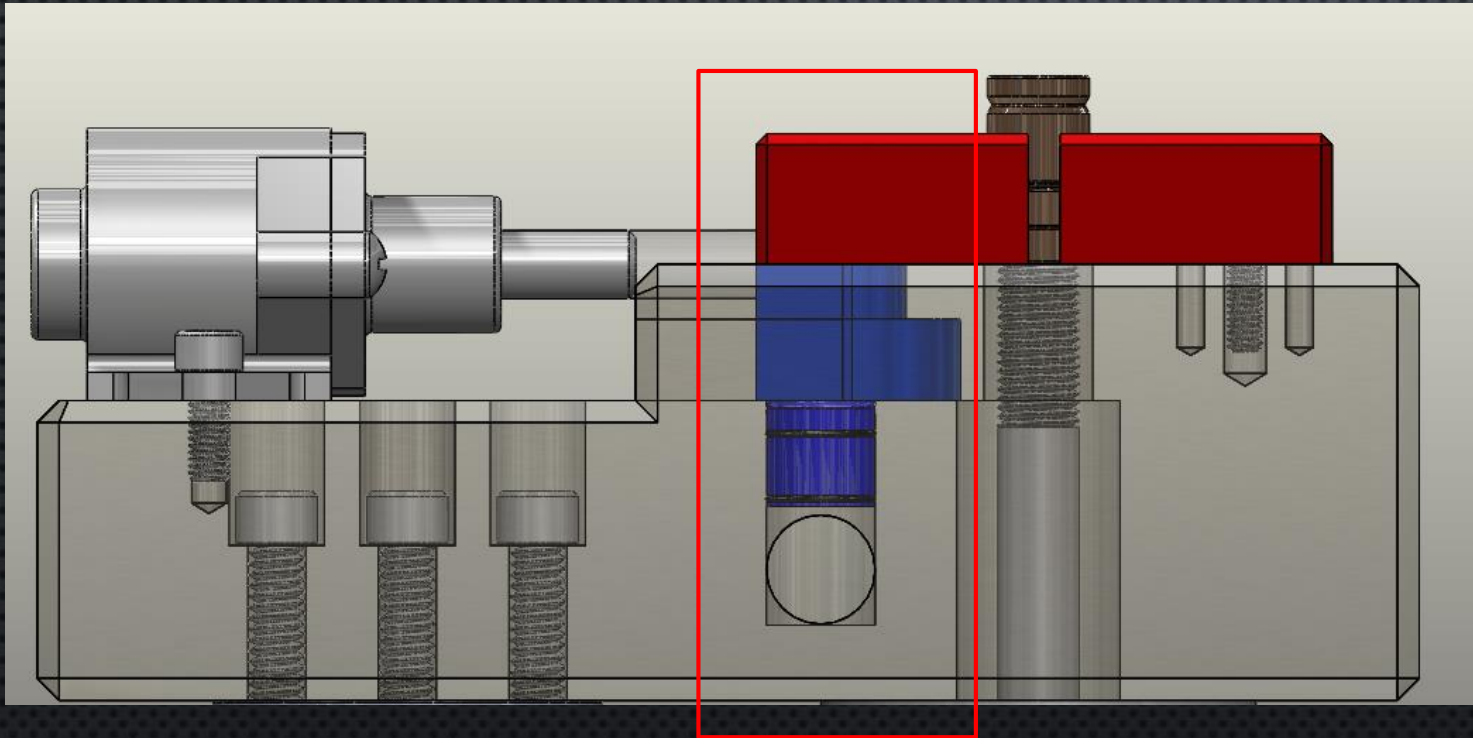
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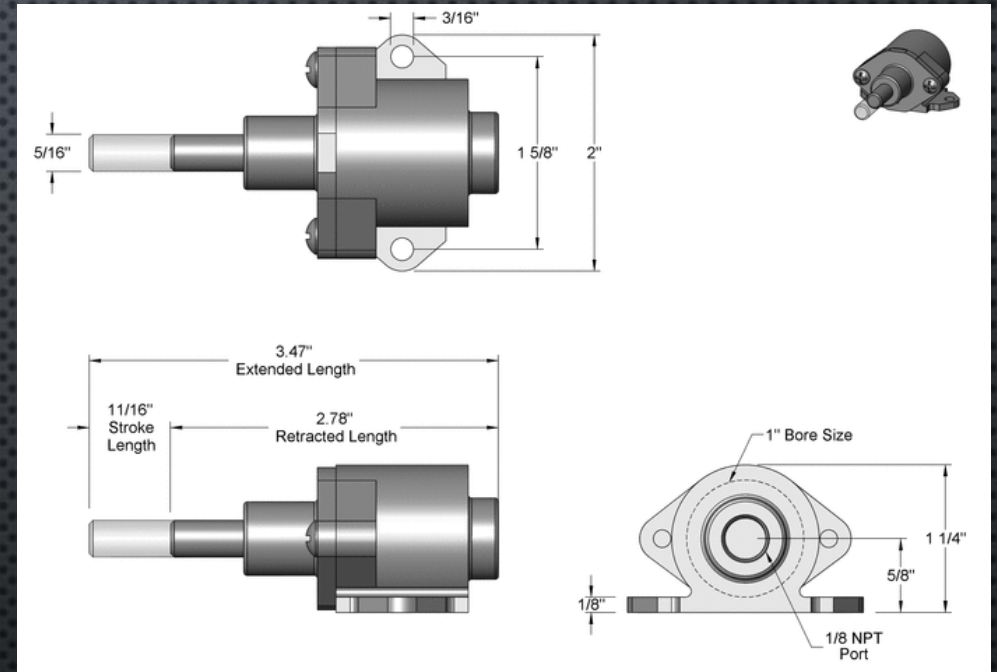
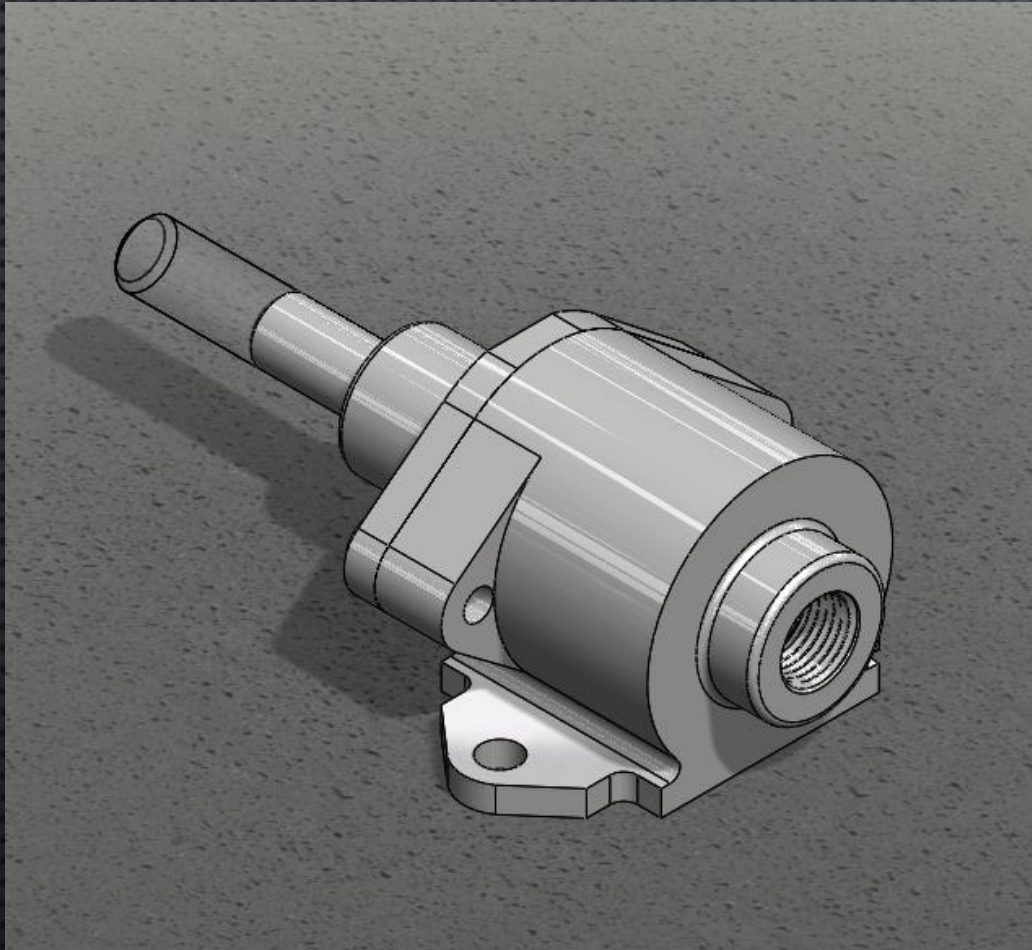
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USE OF COMPRESSED AIR

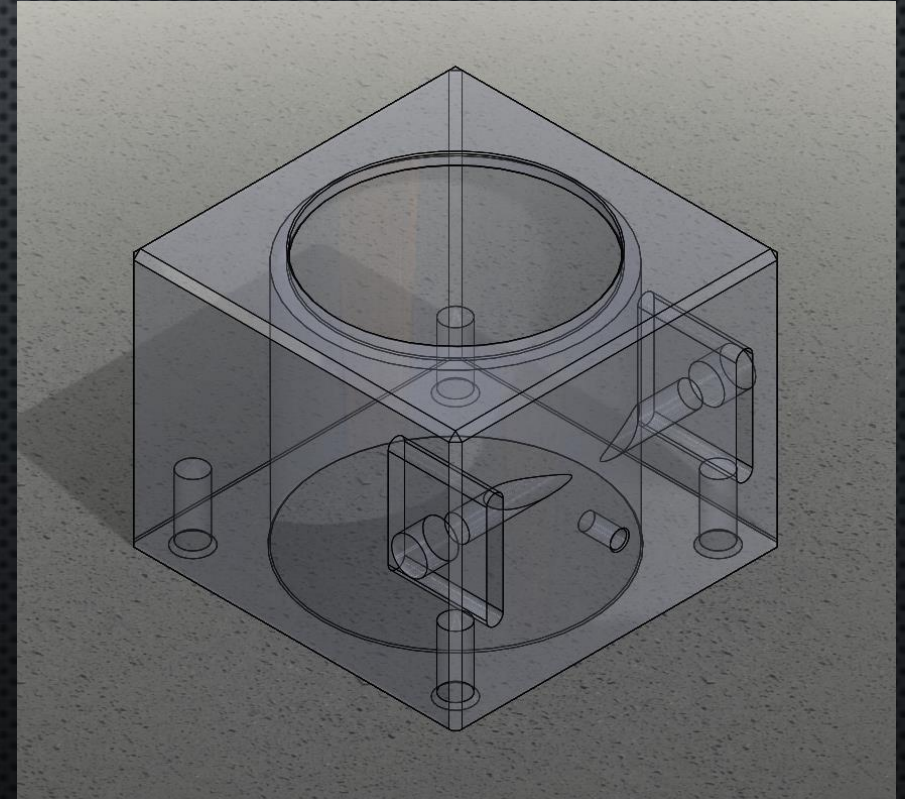
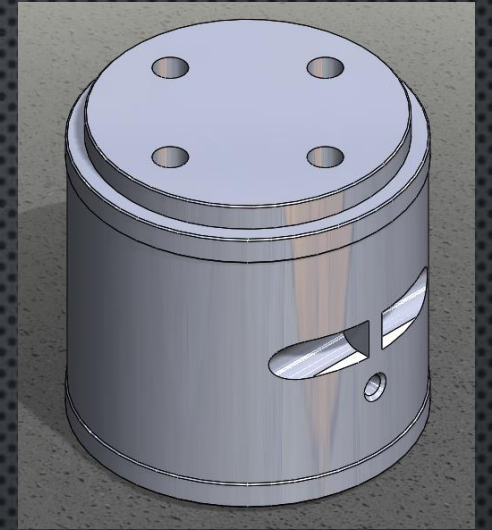
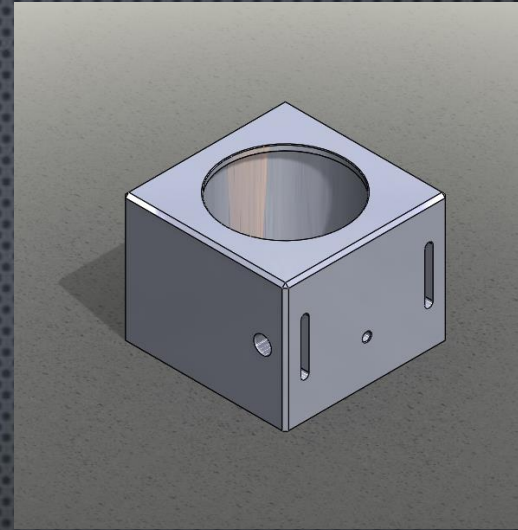
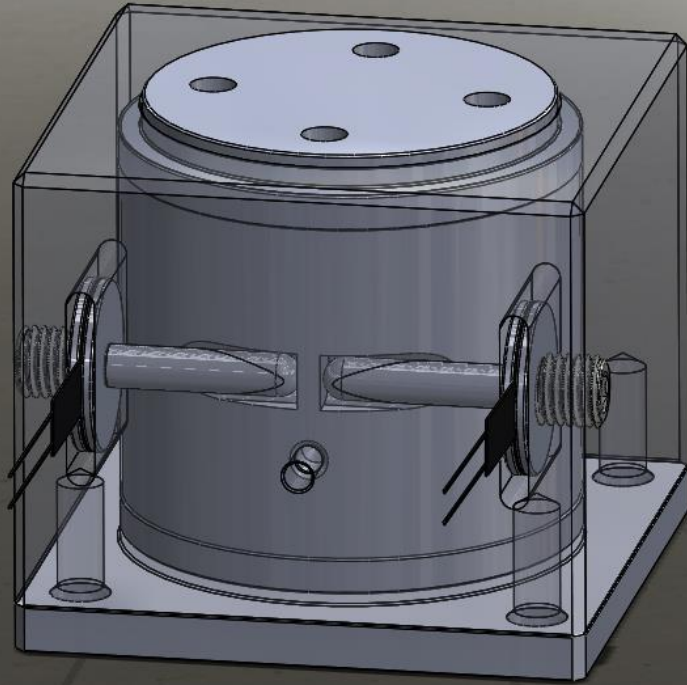


SHORT STROKE CLAMPING AIR CYLINDER

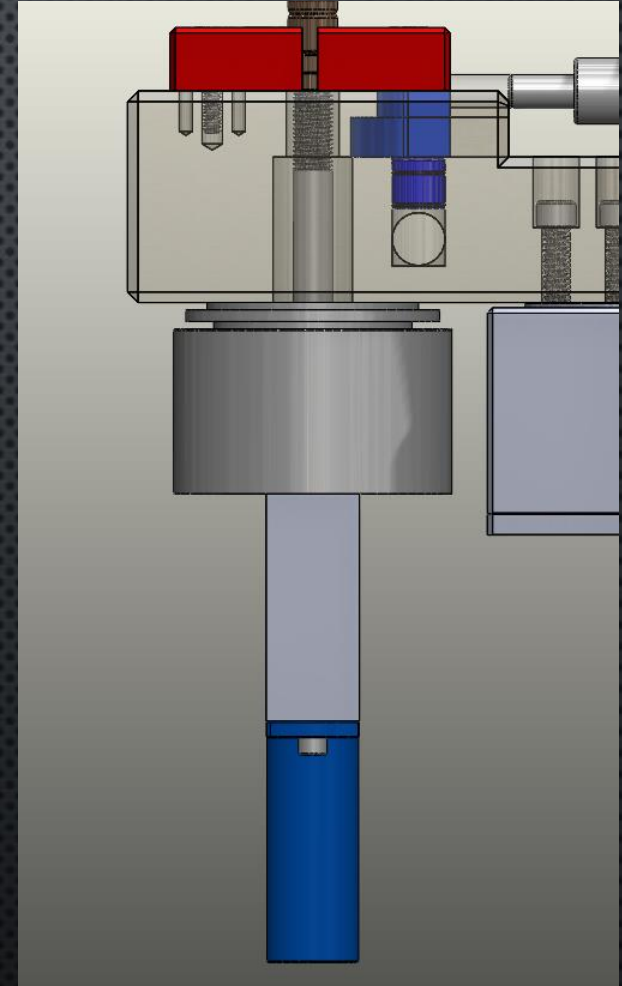
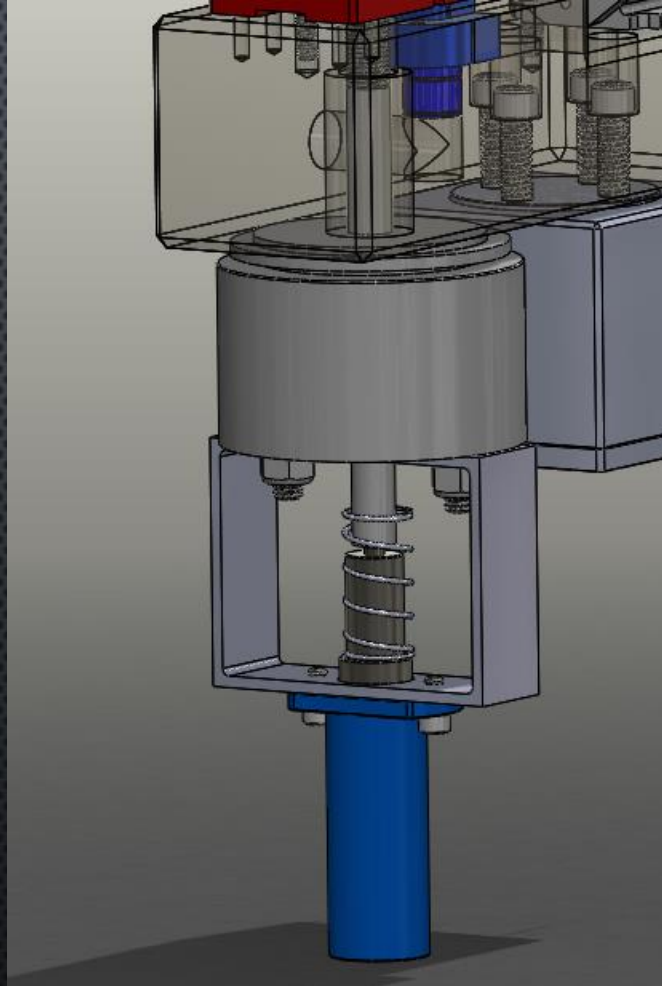
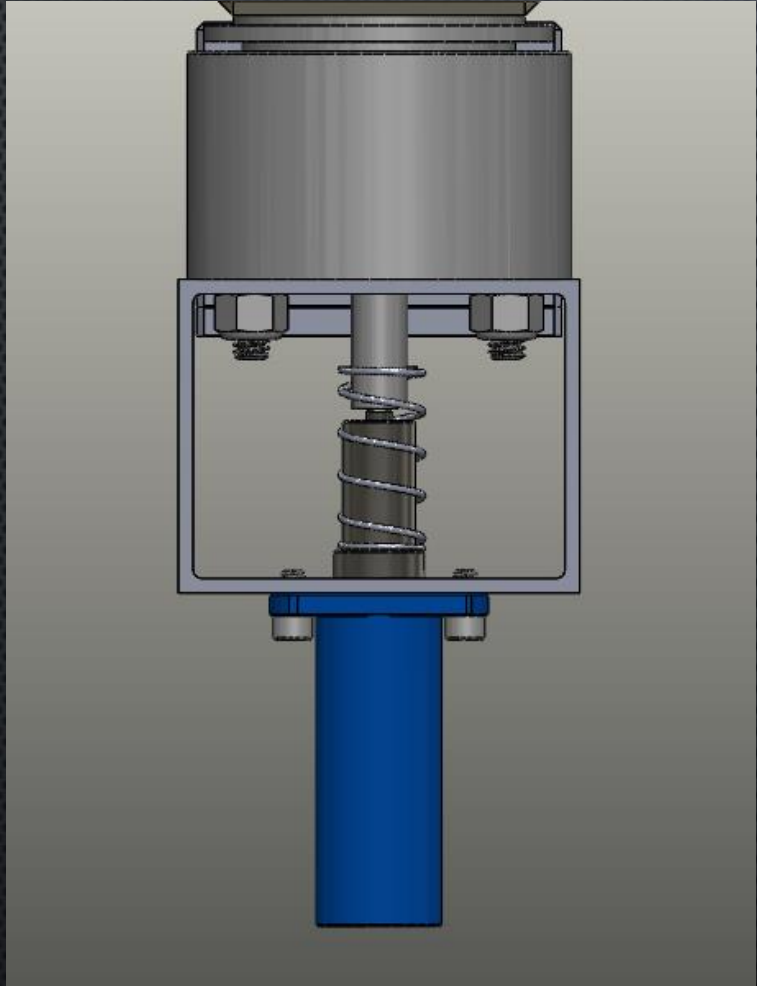


Force @ 100 PSI = 68 lbs

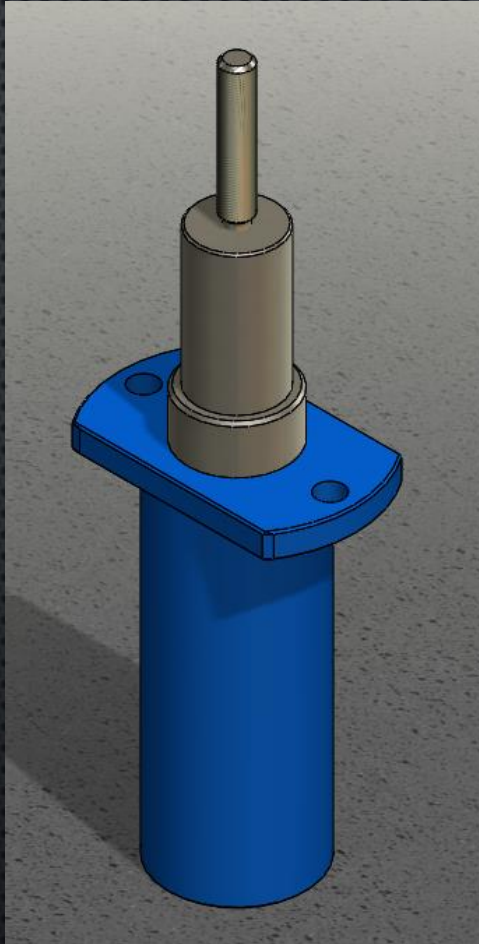
TORQUE SENSOR



SOLENOID AND LINEAR DISPLACEMENT SENSOR



SLS220 LINEAR DISPLACEMENT SENSOR

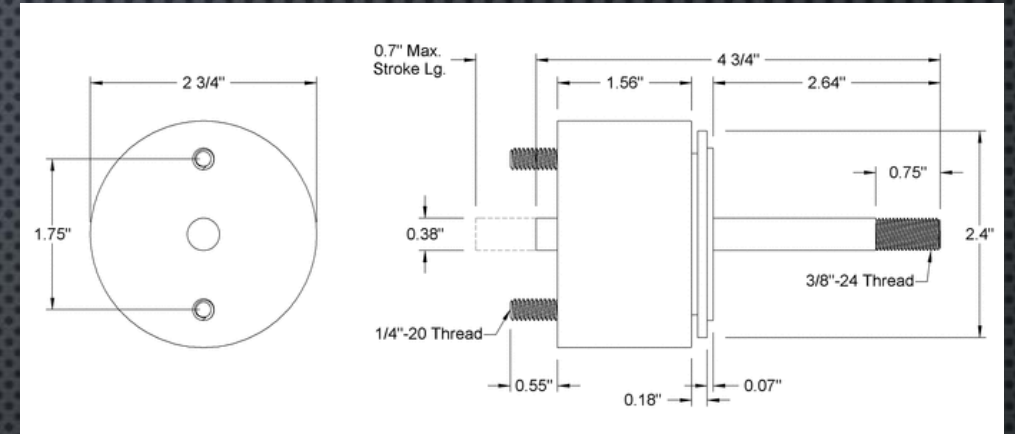
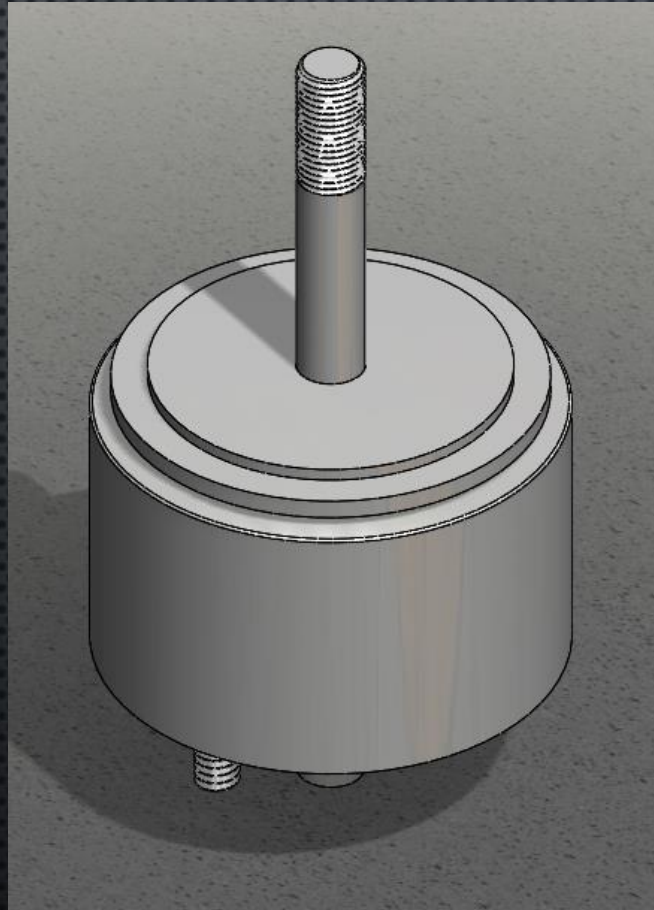
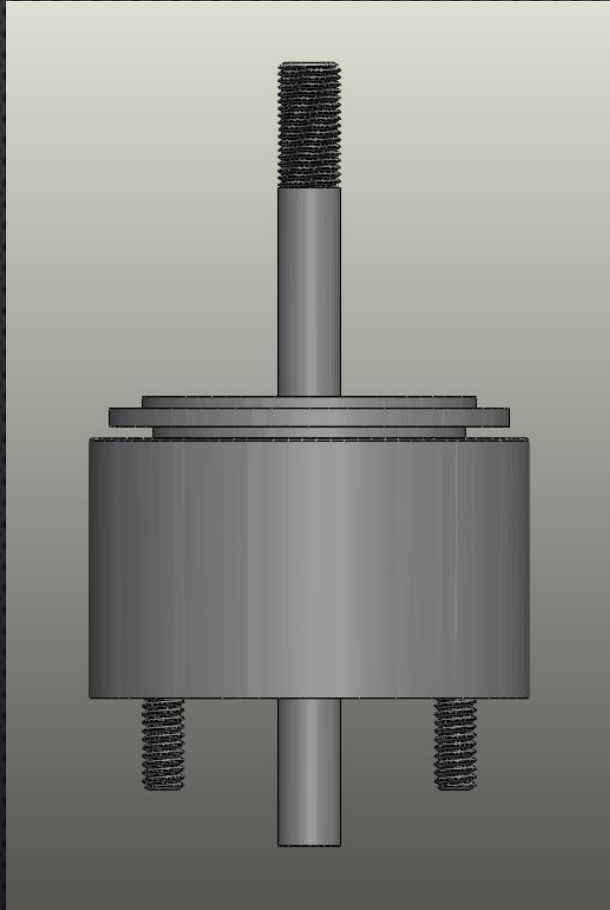


PERFORMANCE

Electrical stroke E	mm	10	20
Resistance	k Ω	0.4 \pm 15%	0.8 \pm 10%
Independent linearity	\pm %	0.5	0.35
Power dissipation at 20°C	W	0.2	0.4
Applied voltage maximum	Vdc	8.9	17.9
Resolution		Virtually infinite	
Hysteresis (repeatability)		Less than 0.01mm	
Operational temperature	°C	-30 to +100	
Output smoothness		To MIL-R-39023 grade C 0.1%	



COMPACT LINEAR SOLENOID



Maximum Stroke Length	0.7"
Length (Pulling)	
Retracted	1.9"
Extended	2.6"
Length (Pushing)	
Retracted	0.3
Extended	1"
Force	1,040 oz. @ 10% stroke length
Force	50 oz. @ 100% stroke length
Voltage	24 Volts DC
Electrical Connection	Wire Leads
Power Draw	80 watts
Seconds On/Off	90/270
Resistance	8 ohms

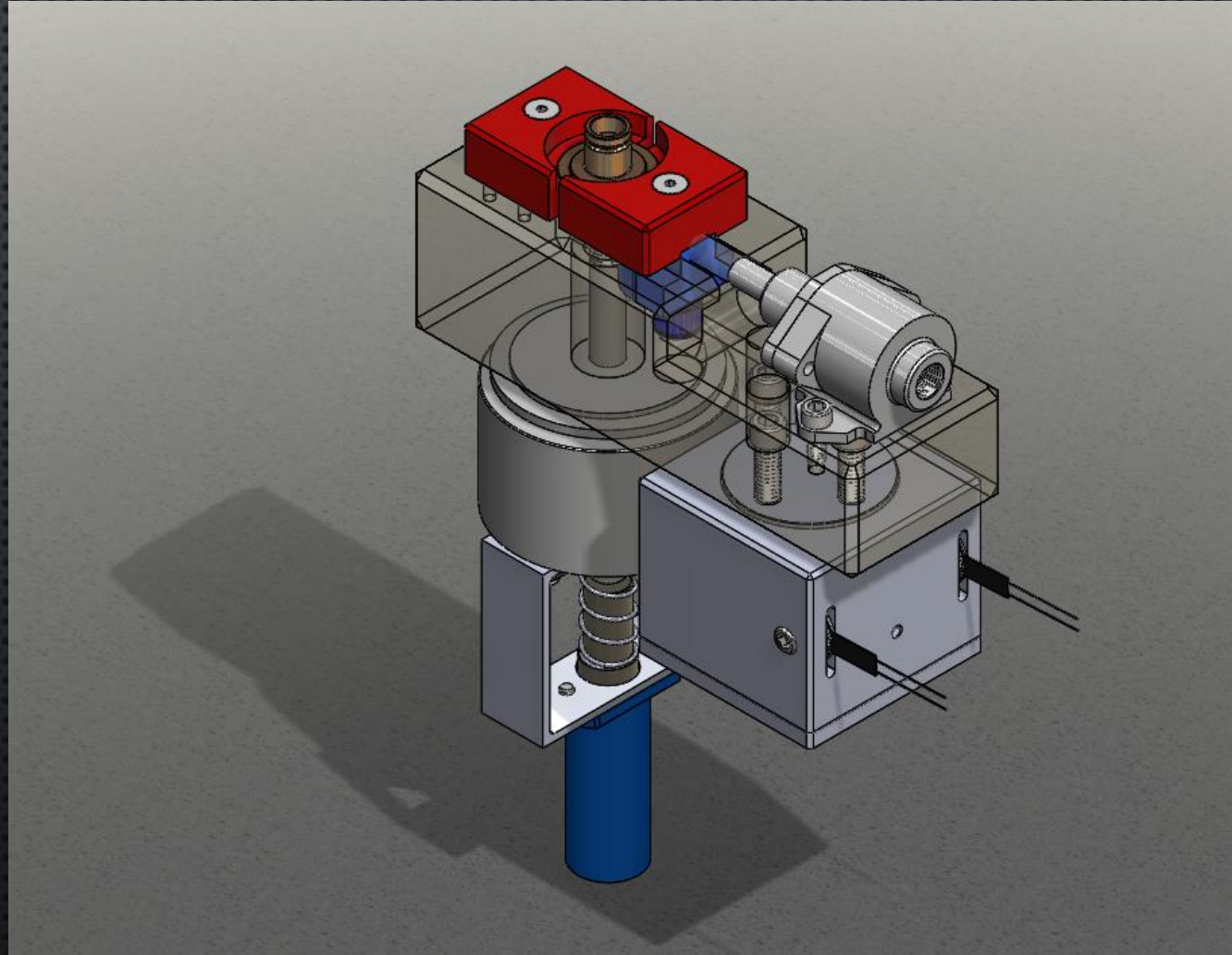
BILL OF MATERIALS/PROJECT COSTS

Purchased Part Number	Discription	Price
M-Carr # 94105A588	Set ScREW	
SLS220/020/0.8K	Linear Displacement Sensor	\$346.08
M-Carr # 6873K510	Compact Linear Solenoid	\$133.40
M-Carr # 62185K64	Short-Stroke Clamping Air Cylinder	\$30.93
M-Carr # 7398K48	Corrosion Resistant Keyed Shaft	\$16.50
M-Carr # 6495K733	3/8 Timing Belt Pulley	\$49.87
M-Carr # 6484K23	3/8 Timing Belt	\$6.17
		\$582.95

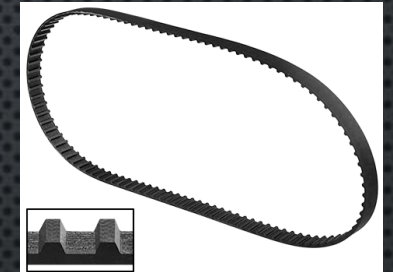
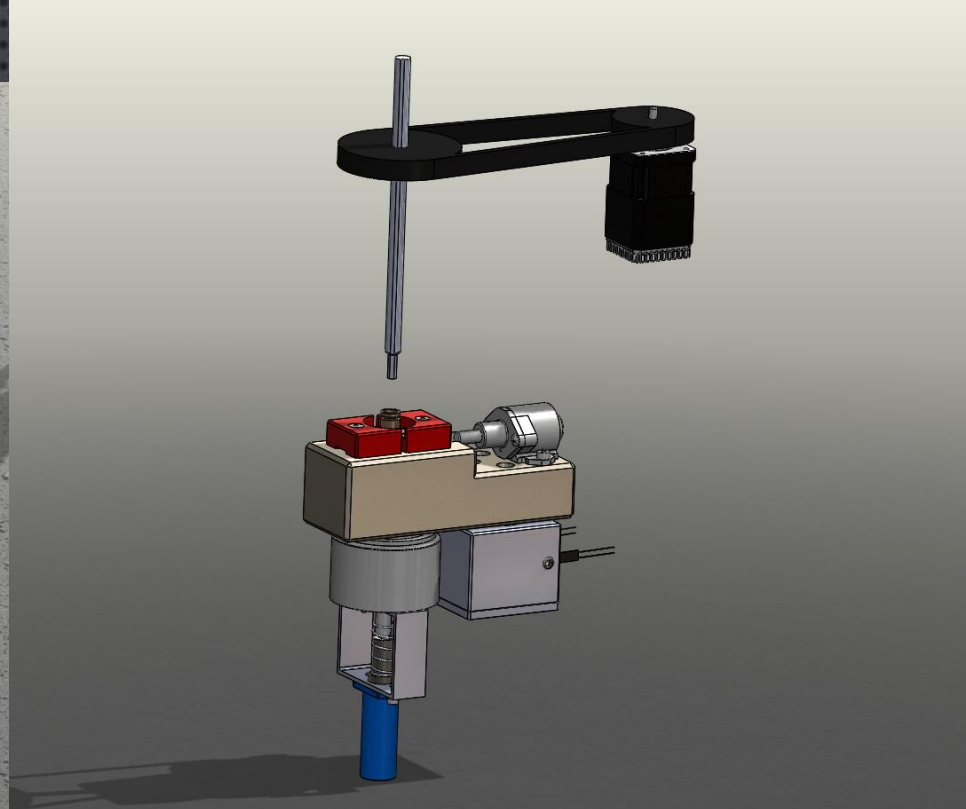
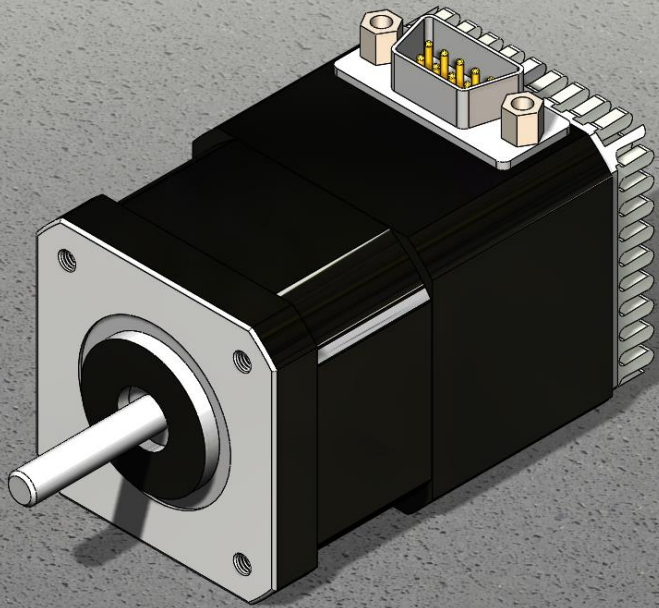
DESIGN PHASES

- PHASE 1 – BASE ASSEMBLY
- PHASE 2 – SPINDLE ASSEMBLY
- PHASE 3 – ARBOR/FRAME ASSEMBLY

PHASE 1 – BASE ASSEMBLY



PHASE 2 – SPINDLE ASSEMBLY



PHASE 3 - FRAME ASSEMBLY

“Bringing it all together”



PATH FORWARD/NEXT STEPS

- COMPLETE PROOF OF CONCEPT FOR PHASES 1-3
- MANUFACTURE PHASES 1-3
- ASSEMBLE HARDWARE
- BEGIN TESTING
- HARDWARE/SOFTWARE ADJUSTMENTS
- FINAL PRODUCT
- FURTHER DEVELOPMENT

QUESTIONS?